AMENDMENTS TO THE CLAIMS

The following claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A nucleic acid array comprising a substrate and a nucleic acid complex, wherein said nucleic acid complex comprises:

a first nucleic acid molecule that is stably attached to the substrate; and

a second nucleic acid molecule that is hybridized to the first sequence, said second nucleic acid molecule comprising (1) a hairpin-forming sequence capable of forming a stem-loop and (2) a reporter-binding sequence capable of hybridizing under nucleic acid array hybridization conditions to a fluorophore-labeled reporter sequence,

wherein formation of said stem-loop modifies fluorescence signals of said fluorophore-labeled reporter sequence when said reporter sequence is hybridized to said second nucleic acid molecule.

2. (Original) The nucleic acid array of claim 1, wherein formation of said stem-loop quenches fluorescence signals of said fluorophore-labeled reporter sequence when said reporter sequence is hybridized to said second nucleic acid molecule.

3. (Original) The nucleic acid array of claim 2, wherein disruption of said stem-loop produces a detectable increase in fluorescence signals of said fluorophore-labeled reporter sequence when said reporter sequence is hybridized to said second nucleic acid molecule.

4. (Original) The nucleic acid array of claim 3, wherein said disruption is mediated by hybridization of a target sequence to said second nucleic acid molecule.

5. (Currently Amended) ~~A~~ The nucleic acid array ~~as in one of claims 2-4~~ of claim 1, wherein said second nucleic acid molecule is hybridized to said fluorophore-labeled reporter sequence.

6. (Original) The nucleic acid array of claim 5, wherein said second nucleic acid molecule comprises said stem-loop.

7. (Original) The nucleic acid array of claim 5, wherein said second nucleic acid molecule does not comprise said stem-loop, and is hybridized to a target sequence.

8. (Currently Amended) ~~A~~ The nucleic acid array ~~as in one of claims 2-7~~ of claim 1, wherein said second nucleic acid molecule comprises at least one guanine base, and formation of said stem-loop brings said at least one guanine base into close proximity to said fluorophore-labeled reporter sequence when said reporter sequence is hybridized to said second nucleic acid molecule, thereby quenching fluorescence signals of said reporter sequence.

9. (Original) The nucleic acid array of claim 8, wherein said at least one guanine base comprises two or more guanine bases.

10. (Original) The nucleic acid array of claim 8, wherein said second nucleic acid molecule comprises, from the 5' end to the 3' end, said reporter-binding sequence, said hairpin-forming sequence, said at least one guanine base, and a sequence that is hybridized to said first nucleic acid molecule.

11. (Original) The nucleic acid array of claim 8, wherein said second nucleic acid molecule comprises, from the 3' end to the 5' end, said reporter-binding sequence, said hairpin-forming sequence, said at least one guanine base, and a sequence that is hybridized to said first nucleic acid molecule.

12. (Currently Amended) ~~A~~ The nucleic acid array ~~as in one of claims 2-11~~ of claim 1, wherein said first nucleic acid molecule is stably attached to different discrete regions on the nucleic acid array, wherein each said different discrete region comprises a different oligonucleotide that is hybridized to said first nucleic acid molecule, said oligonucleotide comprising (1) a hairpin-forming sequence capable of forming a stem-loop

and (2) a reporter-binding sequence capable of hybridizing under nucleic acid array hybridization conditions to a fluorophore-labeled reporter sequence, wherein formation of said stem-loop quenches fluorescence signals of said fluorophore-labeled reporter sequence when said reporter sequence is hybridized to said oligonucleotide, and wherein each said different oligonucleotide is capable of hybridizing to a different target sequence.

13. (Original) The nucleic acid array of claim 12, wherein each said oligonucleotide comprises at least one guanine base, and formation of said stem-loop in said oligonucleotide brings said at least one guanine base into close proximity to said fluorophore-labeled reporter sequence when said reporter sequence is hybridized to said oligonucleotide, thereby quenching fluorescence signals of said reporter sequence.

14. (Original) The nucleic acid array of claim 12, wherein hybridization of one said target sequence to the corresponding oligonucleotide disrupts said stem-loop in the corresponding oligonucleotide, thereby producing a detectable increase in fluorescence signals of said fluorophore-labeled reporter sequence when said reporter sequence is hybridized to the corresponding oligonucleotide.

15. (Original) The nucleic acid array of claim 12, wherein said reporter-binding sequence in each said different oligonucleotide consists of the same nucleotide sequence.

16. (Original) A nucleic acid complex comprising an oligonucleotide hybridized to a fluorophore-labeled reporter sequence, wherein the oligonucleotide comprises a hairpin-forming sequence capable of forming a stem-loop, and wherein formation of the stem-loop modifies fluorescence signals of the reporter sequence when the reporter sequence is hybridized to the oligonucleotide.

17. (Original) The nucleic acid complex of claim 16, wherein formation of the stem-loop quenches fluorescence signals of the fluorophore-labeled reporter sequence when the reporter sequence is hybridized to the oligonucleotide.

18. (Original) The nucleic acid complex of claim 17, wherein disruption of the stem-loop produces a detectable increase in fluorescence signals of the fluorophore-labeled reporter sequence when the reporter sequence is hybridized to the oligonucleotide.

19. (Original) The nucleic acid complex of claim 18, wherein said disruption is mediated by hybridization of a target sequence to the oligonucleotide.

20. (Original) The nucleic acid complex of claim 19, wherein the oligonucleotide is hybridized to the target sequence and does not comprise the stem-loop.

21. (Original) The nucleic acid complex of claim 19, wherein the oligonucleotide comprises the stem-loop and is not hybridized to the target sequence.

22. (Currently Amended) ~~A~~ The nucleic acid complex ~~as in one of claims 17-21~~ of claim 16, wherein the oligonucleotide comprises at least one guanine base, and formation of the stem-loop brings said at least one guanine base into close proximity to the fluorophore-labeled reporter sequence when the reporter sequence is hybridized to the oligonucleotide, thereby quenching fluorescence signals of the reporter sequence.

23. (Original) The nucleic acid complex of claim 22, wherein said at least one guanine base comprises two or more guanine bases.

24. (Original) The nucleic acid complex of claim 22, wherein the oligonucleotide comprises, from one end to the other end, a sequence that is hybridized to the fluorophore-labeled reporter sequence, the hairpin-forming sequence, and said at least one guanine base.

25. (Original) A method for detecting the presence or absence of a target sequence, comprising the steps of:

hybridizing an oligonucleotide to a nucleic acid sample and a fluorophore-labeled reporter sequence, wherein the oligonucleotide comprises (1) a hairpin-forming sequence capable of forming a stem-loop and (2) a sequence capable of hybridizing under nucleic acid array hybridization conditions to the fluorophore-labeled reporter sequence,

wherein the oligonucleotide is capable of hybridization under nucleic acid array hybridization conditions to the target sequence, and hybridization of the oligonucleotide to the target sequence prevents formation of the stem-loop in the oligonucleotide, and wherein formation of the stem-loop quenches fluorescence signals of the fluorophore-labeled reporter sequence when the reporter sequence is hybridized to the oligonucleotide; and

detecting the fluorescent signals of the reporter sequence,

wherein an increase in fluorescence signals of the fluorophore-labeled reporter sequence in the presence of the nucleic acid sample compared to that in the absence of the nucleic acid sample is suggestive of the presence of the target sequence in the sample, and no significant change in fluorescence signals of the fluorophore-labeled reporter sequence in the presence of the nucleic acid sample compared to that in the absence of the nucleic acid sample is suggestive of the absence of the target sequence in the sample.

26. (Original) A method for detecting a sequence difference between a target sequence and a sequence of interest, comprising the steps of:

hybridizing an oligonucleotide to the sequence of interest and a fluorophore-labeled reporter sequence, wherein the oligonucleotide comprises (1) a hairpin-forming sequence capable of forming a stem-loop and (2) a sequence capable of hybridizing under nucleic acid array hybridization conditions to the fluorophore-labeled reporter sequence, wherein the oligonucleotide comprises a sequence that is complementary to the target sequence, and hybridization of the target sequence to the oligonucleotide prevents formation of the stem-loop in the oligonucleotide, and wherein formation of the stem-loop quenches fluorescence signals of the fluorophore-labeled reporter sequence when the reporter sequence is hybridized to the oligonucleotide; and

detecting the fluorescent signals of the reporter sequence,

wherein an decrease in fluorescence signals of the fluorophore-labeled reporter sequence in the presence of the sequence of interest compared to that in the presence of the target sequence, together with an increase in fluorescence signals of the fluorophore-labeled reporter sequence in the presence of the sequence of interest compared to that in the absence of the sequence of interest, is suggestive that the sequence of interest is homologous to but different from the target sequence.

27. (Original) The method of claim 26, wherein the target sequence differs from the sequence of interest by one single nucleotide mutation.

28. (Original) A nucleic acid array comprising a plurality of nucleic acid molecules, each of said nucleic acid molecules being stably attached to a different discrete region on the nucleic acid array, and each of said nucleic acid molecules comprising (1) a hairpin-forming sequence capable of forming a stem-loop and (2) a reporter-binding sequence capable of hybridizing under nucleic acid array hybridization conditions to a fluorophore-labeled reporter sequence, wherein formation of said stem-loop in one said nucleic acid molecule modifies fluorescence signals of said fluorophore-labeled reporter sequence when said reporter sequence is hybridized to said one nucleic acid molecule.

29. (Original) The nucleic acid array of claim 28, wherein formation of said stem-loop in said one nucleic acid molecule quenches fluorescence signals of said fluorophore-labeled reporter sequence when said reporter sequence is hybridized to said one nucleic acid molecule.

30. (Original) The nucleic acid array of claim 29, wherein disruption of said stem-loop in said one nucleic acid molecule produces a detectable increase in fluorescence signals of said fluorophore-labeled reporter sequence when said reporter sequence is hybridized to said one nucleic acid molecule.

31. (Original) The nucleic acid array of claim 30, wherein said disruption is mediated by hybridization of a target sequence to said one nucleic acid molecule.

32. (Currently Amended) ~~A~~ The nucleic acid array ~~as in one of claim 29-31~~ of claim 28, wherein said one nucleic acid molecule is hybridized to said fluorophore-labeled reporter sequence.

33. (Original) The nucleic acid array of claim 32, wherein said one nucleic acid molecule comprises said stem-loop.

34. (Original) The nucleic acid array of claim 32, wherein said one nucleic acid molecule does not comprise said stem-loop, and is hybridized to a target sequence.

35. (Currently Amended) ~~A~~ ~~The~~ nucleic acid array ~~as in one of claims 29-34~~ of claim 28, wherein said one nucleic acid molecule comprises at least one guanine base, and formation of said stem-loop brings said at least one guanine base into close proximity to said fluorophore-labeled reporter sequence when said reporter sequence is hybridized to said one nucleic acid molecule, thereby quenching fluorescence signals of said reporter sequence.

36. (Original) The nucleic acid array of claim 35, wherein said at least one guanine base comprises two or more guanine bases.

37. (Original) The nucleic acid array of claim 35, wherein said one nucleic acid molecule comprises, from the 5' end to the 3' end, said reporter-binding sequence, said hairpin-forming sequence, and said at least one guanine base.

38. (Original) The nucleic acid array of claim 35, wherein said one nucleic acid molecule comprises, from the 3' end to the 5' end, said reporter-binding sequence, said hairpin-forming sequence, and said at least one guanine base.

39. (Currently Amended) ~~A~~ ~~The~~ nucleic acid array ~~as in one of claims 29-38~~ of claim 28, wherein each of said nucleic acid molecules is covalently attached to the different discrete region on the nucleic acid array.

40. (Currently Amended) ~~A~~ ~~The~~ nucleic acid array ~~as in one of claims 29-40~~ of claim 28, wherein each of said nucleic acid molecules is non-covalently attached to the different discrete region on the nucleic acid array.